

# PATENT ABSTRACTS OF JAPAN

(11)Publication number : **07-045758**

(43)Date of publication of application : **14.02.1995**

(51)Int.Cl.

**H01L 23/36**

(21)Application number : **05-192431**

(71)Applicant : **AKUTEI:KK**

(22)Date of filing : **03.08.1993**

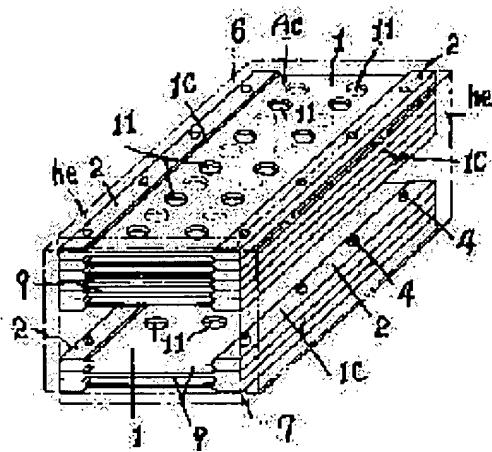
(72)Inventor : **OZEKI TAMIO**

## (54) HEAT SINK AND MANUFACTURE THEREOF

### (57)Abstract:

PURPOSE: To easily obtain a heat sink of new structure excellent in heat dissipating effect.

CONSTITUTION: An extruded metal section is fabricated into a component unit plate 1C composed of connecting parts 2 and a heat dissipating part 1, the component unit plates 1C are jointed together into a product Ac overlapping each other by inserting connecting rods into through-holes 3 bored in the connecting parts 2. Furthermore, vent holes 11 are sporadically provided to the heat dissipating section 1, and a heat releasing body is mounted on a mounting plane which is ground into a smooth surface.



## LEGAL STATUS

[Date of request for examination] **06.12.1993**

[Date of sending the examiner's decision of rejection] **16.07.1996**

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

**\* NOTICES \***

**Japan Patent Office is not responsible for any damages caused by the use of this translation.**

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

---

**CLAIMS**

---

**[Claim(s)]**

[Claim 1] The heat sink which set suitably several-fold metal configuration unit plate which consists of the thick connection section and the radiator of closing in formed successively to the end or both ends in alignment with the longitudinal direction of this connection section, and connected these mutually in the connection section.

[Claim 2] The heat sink according to claim 1 which the radiator was made to intervene between the connection sections and constituted the configuration unit plate.

[Claim 3] The heat sink according to claim 1 or 2 which formed the airstream through-hole in the radiator suitably.

[Claim 4] The heat sink according to claim 3 which was able to shift the location for the airstream through-hole between adjoining configuration unit plates mutually.

[Claim 5] The heat sink according to claim 3 or 4 which carried out the polymerization of the configuration unit plate of a number suitably, and connected these mutually between the shell plates of a pair.

[Claim 6] The manufacture approach of a heat sink of carrying out the fabricating of the metal extruded shape which consists of the radiator configuration section of closing in, and the connection section configuration section which made thick the end section in alignment with the longitudinal direction of this radiator configuration section, and carrying out obtaining the configuration unit plate which consists of the radiator constituted by said radiator configuration section, and the connection section which constituted by the connection section configuration section, carrying out a polymerization mutually in this configuration unit plate, and connecting mutually in the connection section as the description.

[Claim 7] The manufacture approach of the heat sink according to claim 6 characterized by carrying out connection fixing with the connection lever which the airstream through-hole was formed in the radiator configuration section of a metal extruded shape, the bore was formed [ lever ] in the connection section configuration section, and the configuration unit plate was obtained [ lever ] after an appropriate time, and made said bore penetrate this configuration unit plate.

[Claim 8] The manufacture approach of the heat sink according to claim 6 characterized by connecting the configuration unit plate which cut the metal extruded shape, obtained the configuration unit plate, formed the airstream through-hole in the radiator of a configuration unit plate after an appropriate time, and formed the bore in the connection section, penetrated the connection lever to the bore, and carried out the polymerization mutually.

[Claim 9] The manufacture approach of the heat sink of claim 6 characterized by carrying out grinding of the connection section polymerization side by the side of the end of the others which face the end by the side of the radiator of the connection section after polymerization connection in a configuration unit plate thru/or claim 8.

---

[Translation done.]

## \* NOTICES \*

**Japan Patent Office is not responsible for any damages caused by the use of this translation.**

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

## DETAILED DESCRIPTION

## [Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to a heat sink and its manufacture approach.

[0002]

[Description of the Prior Art] For example, there are the heat sink and its manufacture approach of JP,3-40460,A printing.

[0003] The heat sink of this conventional example is the thing of structure which held spacing between fins in contact with the fin which solders to one side of the base plate made from aluminum so that it may become parallel to mutual about many fins, had prepared in the fin, and adjoins a lifting, and after it obtains a base plate and a fin at another process, he is trying to fix these mutually by solder plating by supersonic vibration, in order to obtain this.

[0004]

[Problem(s) to be Solved by the Invention] It is difficult for the thing of structure to have to carry out addressing \*\*\*\*\* adhesion of the fin to one sheet on a base plate, for the means to be complicated, and for the process tolerance of the end lifting which a fin forms in order to install on a base plate so that it may moreover become parallel to mutual by using an end lifting as a scale so to speak to take an advanced technique conventionally [ said ], and to obtain a uniform product.

[0005]

[Means for Solving the Problem] This invention constitutes a configuration unit plate from a radiator of closing in, and the thick connection section generally paying attention to the fault of said conventional example. In order to be what heightened the heat dissipation effectiveness by accomplishing with the configuration which carried out the polymerization of this configuration unit plate, and was connected in the connection section, and preparing an airstream through-hole in a radiator and to obtain this heat sink A configuration unit plate can be obtained and it enables it to obtain a product simply by making polymerization connection of this configuration unit plate by cutting this in proper magnitude using a metal extruded shape.

[0006]

[Example] The perspective view in the condition that the drawing showed the example of the heat sink concerning this invention and its manufacture approach, each perspective view of the first operation article thru/or the fifth operation article and drawing 6 performed the perspective view of the first extruded shape to the first extruded shape, and, as for drawing 7, drawing 1 thru/or drawing 5 performed fabricating, the perspective view in the condition that drawing 8 similarly performed fabricating to the first extruded shape, and drawing 9 are the perspective views of the second extruded shape.

[0007] This invention accomplishes the second extruded shape Bb shown by the first extruded shape Ba or drawing 9 like drawing 6 with a material plate. Although it is what performed fabricating to this material plate, obtained the configuration unit plates 1A, 1B, 1C, and 1E, was made to carry out the polymerization of these configuration unit plates 1A, 1B, 1C, and 1E, connected each other, and was used as Products Aa, Ab, Ac, Ad, and Ae and the second extruded shape Ba and Bb is constituted from an aluminum extruded shape for a start As long as raw material cost is disregarded, you may constitute from a metal of copper and others.

[0008]

[The first example] The first operation article Aa shown by drawing 1 is a thing made from the first extruded shape Ba shown by drawing 6. The first extruded shape Ba It is what formed successively and constituted the connection section configuration sections 2a and 2a of thickness (an example 3mm) to the both ends in alignment with the longitudinal direction of radiator configuration section 1a of closing in (an example 1mm). Consist proper spacing in connection section configuration section 2a of this first extruded shape Ba, and bores 3 and 3 and -- are installed successively. Configuration unit plate 1A which consists of the radiator 1 which cut to necessary die length and was constituted by radiator configuration section 1a after an appropriate time, and the connection section 2 constituted by connection section configuration section 2a is obtained. Carry out the polymerization of the configuration unit plates 1A and 1A of a number, and -- mutually suitably, and the aforementioned bores 3 and 3 and -- which were made in agreement between configuration unit plate 1A and 1A are made to penetrate the connection lever 4. Connection fixing of the configuration unit plates 1A and 1A and -- is carried out for the edge of this linkage lever 4 in total, grinding of the connection section polymerization side of other ends corresponding to the end by the side of the radiator 1 of the connection section 2 is carried out, it considers as a smooth side, and this smooth side is made into the clamp face of a heating element (for example, Peltier device) he.

[0009] In drawing 1 , 6 is an upper outer casing, 7 is a substrate, if these attach a fan 8 in the part which attaches to the

configuration unit plates 1A and 1A and -- with said connection lever 4, and projects from the configuration unit plates 1A and 1A of a substrate 7, and -- and work this fan 8, the forced draft of them is carried out to a radiator 1 and the gap section 9 between one, and they can increase the heat dissipation effectiveness of a radiator 1.

[0010] In addition, after obtaining configuration unit plate 1A, bores 3 and 3 and -- may be drilled in the connection section 2.

[0011]

[The second example] Although drawing 2 shows the second operation article, it explains the second example based on this drawing 2, drawing 6, and drawing 7.

[0012] As drawing 2 shows, the second operation article Ab installs successively the airstream through-holes 11 which change from the long hole which results in one of other connection sections 2 from one connection section 2 to a radiator 1 to the longitudinal direction of a radiator 1, makes a radiator 1, the gap sections 9 and 9 between one, and -- open for free passage mutually, and plans the heat dissipation effectiveness.

[0013] Like the first operation article Aa, this second operation article Ab attaches the upper outer casing 6 and a substrate 7, and by using a fan 8, it increases the heat dissipation effectiveness still further, and they can be used for it.

[0014] In addition, as drawing 3 shows, when a location is shifted between adjoining configuration unit plate 1B and 1B and it uses a fan 8, this location \*\*\*\*\* of the airstream through-hole 11 is effective on the heat dissipation effectiveness.

[0015] In order to obtain the second operation article Ab, after forming said airstream through-hole 11 and bore 3 in the first extruded shape Ba, it cuts to proper die length, accomplishes with configuration unit plate 1B, and passes through the almost same process as the first example hereafter.

[0016]

[The third example] Although drawing 3 and drawing 8 show the third example, since it only differs from the second operation article Ab in the point which has shifted the location using configuration unit plate 1C which made the radiator 1 dotted with the airstream through-hole 11 between adjoining configuration unit plate 1C and 1C in the airstream through-hole 11, residual explanation is omitted, the Product Ac, i.e., third operation article, of this example.

[0017]

[The fourth example] Although drawing 4 is the perspective view of the fourth operation article Ad, this fourth operation article Ad combines a fan 8 with the third operation article Ac.

[0018]

[The fifth example] Drawing 5 and drawing 9 show the fifth example.

[0019] As drawing 9 shows the fifth example, it is what set to configuration unit plate 1E by having been made from the second extruded shape Bb which equipped the end in alignment with the longitudinal direction of radiator configuration section 1a with connection section configuration section 2a, and was used as the fifth operation article Ae combining this configuration unit plate 1E, and the residual point is the same as the first example almost.

[0020] In addition, slitting is prepared in the radiator 1 of configuration unit plate 1E, it is made the shape of a ctenidium, and, of course, you may make it heighten the heat dissipation effectiveness.

[0021]

[Effect of the Invention] Since this invention is a configuration as aforementioned, it can offer easily the heat sink with which the connection section excelled [ carry out / so to speak, become a spacer and / between radiators, / with a configuration unit plate / polymerization connection ] in the heat dissipation effectiveness.

[Translation done.]

(19)日本国特許庁 (JP)

(12) 公開特許公報 (A)

(11)特許出願公開番号

特開平7-45758

(43)公開日 平成7年(1995)2月14日

(51)Int.Cl.<sup>b</sup>  
H 01 L 23/36

識別記号

府内整理番号

F I

技術表示箇所

H 01 L 23/ 36

2

審査請求 有 請求項の数9 O.L (全 4 頁)

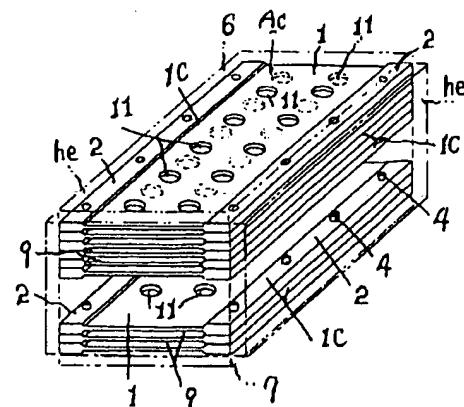
(21)出願番号	特願平5-192431	(71)出願人	592168485 株式会社アクティー 東京都大田区大森南2丁目24番8号
(22)出願日	平成5年(1993)8月3日	(72)発明者	大関民男 東京都大田区大森南2丁目24番8号 株式会社アクティー内
		(74)代理人	弁理士 土橋 秀夫 (外1名)

(54)【発明の名称】 ヒートシンクおよびその製造方法

(57)【要約】

【目的】 放熱効果の優れた斬新な構造のヒートシンクを簡単に得られる。

【構成】 金属製押出し形材を二次加工して連結部2と放熱部1とから成る構成単位板1Cを得、該構成単位板1Cを相互に重合して連結部2に形成した透孔3に連結杆3を貫通させてかしめて各構成単位板1C, 1C, …を連結して製品A cとする。なお、放熱部1には空気流通孔11, 11, …を点在させ、発熱体heを、平滑面に研削加工した取付面5に取付けるようにして用いる。



## 【特許請求の範囲】

【請求項1】 肉厚の連結部と、該連結部の長手方向に沿う一端又は両端に連設した肉薄の放熱部とから成る金属製の構成単位板を適宜数重合し、これらを連結部において互いに連結した、ヒートシンク。

【請求項2】 連結部間に放熱部を介在させて構成単位板を構成した、請求項1記載のヒートシンク。

【請求項3】 放熱部に適宜空気流通孔を形成した、請求項1又は請求項2記載のヒートシンク。

【請求項4】 隣接する構成単位板間の空気流通孔を互いに位置をずらせた、請求項3記載のヒートシンク。

【請求項5】 一対の外板間に適宜数の構成単位板を重合し、これらを互いに連結した、請求項3又は請求項4記載のヒートシンク。

【請求項6】 肉薄の放熱部構成部と、該放熱部構成部の長手方向に沿う一端部を肉厚にした連結部構成部とから成る金属製押出し形材を二次加工して、前記放熱部構成部によって構成した放熱部と、連結部構成部によって構成した連結部とから成る構成単位板を得、この構成単位板を相互に重合して連結部において互いに連結することを特徴とするヒートシンクの製造方法。

【請求項7】 金属製押出し形材の放熱部構成部に空気流通孔を、連結部構成部に透孔を形成し、かかる後、構成単位板を得、該構成単位板を前記透孔に貫通させた連結杆によって連結固定することを特徴とする請求項6記載のヒートシンクの製造方法。

【請求項8】 金属製押出し形材を切断して構成単位板を得、かかる後、構成単位板の放熱部に空気流通孔を、また、連結部に透孔を形成し、透孔に連結杆を貫通して相互に重合させた構成単位板を連結することを特徴とする請求項6記載のヒートシンクの製造方法。

【請求項9】 構成単位板を重合連結後、連結部の放熱部側の一端に相対する他の一端側の連結部重合面を研削することを特徴とする請求項6ないし請求項8のヒートシンクの製造方法。

## 【発明の詳細な説明】

## 【0001】

【産業上の利用分野】 本発明はヒートシンクおよびその製造方法に関するものである。

## 【0002】

【從来の技術】 例えば、特開平3-40460号公報所載のヒートシンクおよびその製造方法がある。

【0003】 この従来例のヒートシンクは、アルミニウム製のベースプレートの片面に多数のフィンを相互に平行になるように半田付けし、フィンに設けた切り起こしを、隣接するフィンに当接してフィン間の間隔を保持するようにした構造のもので、これを得るために、ベースプレートとフィンを別工程で得た後、これらを超音波振動による半田メッキにより互いに固着するようにしている。

## 【0004】

【発明が解決しようとする課題】 前記従来構造のものは、ベースプレート上にフィンを一枚宛いわば接着しなければならず、その手段が煩雑であり、しかも、切り起こしをいわばスケールとして相互に平行になるようにベースプレート上に並設するため、フィンの形成する切り起こしの加工精度に高度の技術を要し、均一な製品を得ることがむずかしい。

## 【0005】

【課題を解決するための手段】 本発明は、前記従来例の欠点に着目し、概して、肉薄の放熱部と肉厚の連結部とで構成単位板を構成し、該構成単位板を重合して連結部において接続した構成と成し、放熱部に空気流通孔を設けることによって放熱効果を高めるようにしたもので、このヒートシンクを得るために、金属製の押出し形材を用い、これを適宜の大きさに切断することにより構成単位板を得られ、該構成単位板を重合接続することにより簡単に製品を得られるようにしたものである。

## 【0006】

【実施例】 図面は、本発明に係るヒートシンクおよびその製造方法の実施例を示し、図1ないし図5は第一実施品ないし第五実施品のそれぞれの斜視図、図6は第一押出し形材の斜視図、図7は第一押出し形材に二次加工を施した状態の斜視図、図8は同じく第一押出し形材に二次加工を施した状態の斜視図、図9は第二押出し形材の斜視図である。

【0007】 本発明は、図6のような第一押出し形材B a或いは図9で示す第二押出し形材B bを素材板と成し、該素材板に二次加工を施して構成単位板1 A, 1 B, 1 C, 1 Eを得、該構成単位板1 A, 1 B, 1 C, 1 Eを重合させて互いに接続して製品A a, A b, A c, A d, A eとしたもので、第一、第二の押出し形材B a, B bはアルミ押出し形材で構成するが、原料コストを無視すれば銅その他の金属で構成しても良い。

## 【0008】

【第一実施例】 図1で示す第一実施品A aは、図6で示す第一押出し形材B aを素材とするもので、第一押出し形材B aは、肉薄(実施例では1mm)の放熱部構成部1 aの長手方向に沿う両端に肉厚(実施例では3mm)の連結部構成部2 a, 2 aを連設して構成したもので、この第一押出し形材B aの連結部構成部2 aに適宜の間隔を存して透孔3, 3, …を列設し、かかる後、所要の長さに切断して放熱部構成部1 aによって構成した放熱部1と連結部構成部2 aによって構成した連結部2とから成る構成単位板1 Aを得、適宜数の構成単位板1 A, 1 A, …を相互に重合し、構成単位板1 A, 1 A間において一致させた前記の透孔3, 3, …に連結杆4を貫通させ、該連結杆4の端部をかじめて構成単位板1 A, 1 A, …を連結固定し、連結部2の放熱部1側の一端に対応する他の一端の連結部重合面を研削して平滑面とし、

該平滑面を発熱体（例えば、ペルチ工素子） $h\ e$ の取付面としたものである。

【0009】図1において、6は上外装板、7は基板で、これらは、前記連結杆4によって構成単位板1A, 1A, …に組付け、また、基板7の構成単位板1A, 1A, …より突出する部分にはファン8を取付けて、このファン8を稼働させると、放熱部1, 1間の間隙部9に強制通風され、放熱部1の放熱効果を増大させることができる。

【0010】なお、構成単位板1Aを得た後、連結部2に透孔3, 3, …を穿設しても良い。

【0011】

【第二実施例】図2は第二実施品を示すが、この図2と図6および図7に基いて第二実施例を説明する。

【0012】図2で示すように第二実施品A bは、放熱部1に一方の連結部2から他の一方の連結部2に至る長孔より成る空気流通孔11を、放熱部1の長手方向に列設して、放熱部1, 1間の間隙部9, 9, …を互いに連通させて放熱効果を図ったものである。

【0013】この第二実施品A bは、第一実施品A aと同様、上外装板6と基板7を組付け、ファン8を用いることにより放熱効果を尚一層増大させて用いることができる。

【0014】なお、空気流通孔11は図3で示すように、隣接する構成単位板1B, 1B間で位置をずらしても良いし、ファン8を用いる場合は、この位置ずらせが放熱効果上有効である。

【0015】第二実施品A bを得るには、第一押出し形材B aに前記空気流通孔11と透孔3を形成後、適宜の長さに切断して構成単位板1Bと成し、以下、第一実施例とほぼ同様の工程を経るのである。

【0016】

【第三実施例】第三実施例を図3および図8で示すが、本実施例の製品すなわち第三実施品A cは、放熱部1に空気流通孔11を点在させた構成単位板1Cを用い、空気流通孔11には隣接する構成単位板1C, 1C間で位置をずらせている点において第二実施品A bと異なるだけであるので、残余の説明は省略する。

【0017】

【第四実施例】図4は第四実施品A dの斜視図である

が、この第四実施品A dは、第三実施品A cにファン8を組合せたものである。

【0018】

【第五実施例】第五実施例を図5および図9で示す。

【0019】第五実施例は、図9で示すように、放熱部構成部1aの長手方向に沿う一端に連結部構成部2aを備えた第二押出し形材B bを素材として構成単位板1Eとし、該構成単位板1Eを組合せて第五実施品A eとしたもので、残余の点は第一実施例とほぼ同様である。

【0020】なお、構成単位板1Eの放熱部1に切り込みを設けて樹歯状にして放熱効果を高めるようにしても良いことは勿論である。

【0021】

【発明の効果】本発明は前記の通りの構成であるから、連結部が放熱部間のいわばスペーサとなり、構成単位板と単に重合連結するだけで放熱効果の優れたヒートシンクを簡単に提供できる。

【図面の簡単な説明】

【図1】第一実施品の斜視図。

【図2】第二実施品の斜視図。

【図3】第三実施品の斜視図。

【図4】第四実施品の斜視図。

【図5】第五実施品の斜視図。

【図6】第一押出し形材の斜視図。

【図7】第一押出し形材に二次加工を施した状態の斜視図。

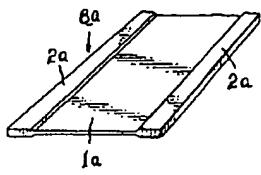
【図8】第一押出し形材に二次加工を施した状態の斜視図。

【図9】第二押出し形材の斜視図。

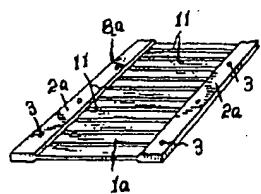
【符号の説明】

1A, 1B, 1C, 1E	構成単位板
B a	第一押出し形材
B b	第二押出し形材
1	放熱部
1 a	放熱部構成部
2	連結部
2 a	連結部構成部
3	透孔
4	連結杆
11	空気流通孔

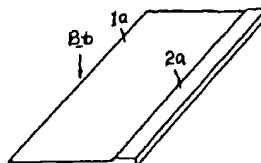
【図6】



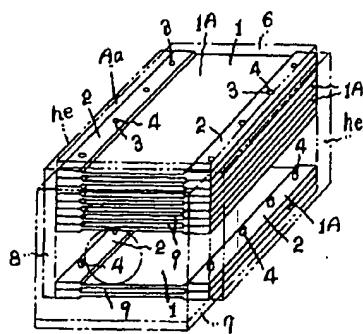
【図7】



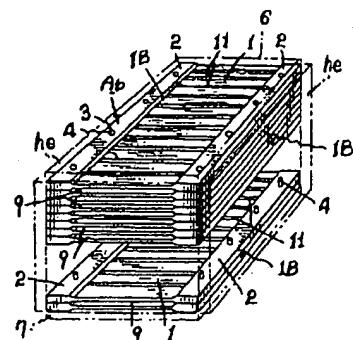
【図9】



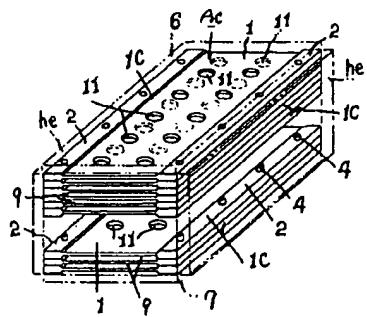
[図1]



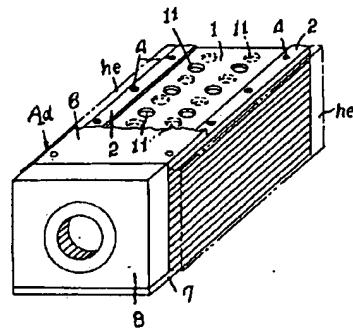
〔図2〕



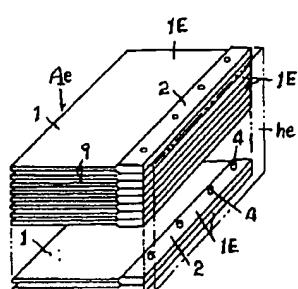
[图3]



[図4]



【习题5】



[図8]

